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# Making the most of office technology

The relationships between what people do and how they communicate



*Introducing new office technology can be less traumatic if there is an understanding of the nature of communications in different tasks, say Professor Dr. Arnold Picot of the University of Hannover and Professor Dr. Ralf Reichwald of the Hochschule der Bundeswehr.*

Despite the substantial investment by companies in office technology there is still remarkably little experience or information about how work units and jobs should be re-organized in order to get the best from the new technologies. Combining the communication, processing, storage and retrieval of information in a variety of forms – data, text, speech and image – in one terminal at each work station can offer massive

increases in efficiency and job satisfaction. At the same time, if handled badly, it can lead to demoralization, misunderstandings and poor working practices that undermine any hoped-for efficiency gains.

Creating a strategy to maximize the organizational benefits of new office technology and avoid negative side-effects has been a primary concern of a number of companies in West Germany, including Siemens, Telfonbau & Normalzeit, 3M, Tandberg Data, PA, and the federal ministries of Research and Technology and Post and Telecommunications.

Devising such a strategy depends on an understanding of the different tasks involved in all levels of office work, the corresponding communica-

tion needs and hence the types of new communication technology that can help perform those tasks better. Working with the companies and organizations mentioned above, we set out to discover the answers to three key questions:

**What is the relationship between what people do in their jobs and the kind of communication they use?**

**What types of organizational conflict are likely to arise as a result of introducing the 'office of the future'?**

**What strategies can we design to make the most of the opportunities for increased office work efficiency offered by the new technologies?**

To answer these questions we began by breaking down office tasks according to their requirement for information, the need for co-operation to get tasks done and the degree of formalization or standardization of the information to be processed. We found that there are essentially three types of tasks, each of which creates very different demands on communication systems.

The first (Type 1) involves processing information which cannot easily be formally structured. The work is complex: what type of information is required, where it might be found and who it is to be shared with are at first unknown. Many different potential ways of solving the problems involved in the task are possible. This type of problem-solving process usually takes a long time. The task leader normally has management status and a support team attached to him or her personally, responsible for writing, filing, despatch and so on. Many tasks cannot be pre-planned and must be dealt with speedily. The unit's functioning depends greatly on the quality of information technology available to it and on the calibre of the support staff. Typical tasks of this sort range from one-off decisions on pricing or purchase to continuous activities such as operations management and strategic planning.

In the second task type, informa-

tion processing and decision making can be partly formalized but the situation is characterized by a changing problem structure. The performance of the task is subject to rules and guidelines which cannot always be systematized. Even the classification of a particular process as routine or a one-off case requires special expertise. What information is needed cannot be determined from the outset, co-operation links vary in their intensity and partners change. The exchange of information occurs regularly, in writing and through predetermined channels. Assistance is required in the compilation and communication of text and in information administration. Support is generally provided by word processing and secretarial services, which – depending on the organizational structures of the support services – are effective to varying degrees.

In Type 3 tasks information processing can be fully formalized. It involves routine problems with a constant structure. Usually communication is with the same partners, so to a large extent the information requirement can be planned. Because the task can follow firm rules, operating sequences can be programmed. Data processing may be so standardized (as in the insurance industry) that the written information is produced automatically without the task leader influencing the content at all.

These three types of tasks are models. In reality, people's jobs tend to include elements of more than one type, perhaps all three.

Neither do task types relate to hierarchical levels in an organization. For example, management tasks are not exclusively Type 1. Routine tasks can and do occur in the management field. There are some areas, such as banking and insurance, where all levels of activity have a high degree of formalization, though also revealing Type 1 and Type 2 characteristics.

The less routine a task, the more difficult it is to program its communication aspects. Personal discussions, dialogue and conferences are essential in Type 1 tasks to obtain infor-

mation and solve problems. In the management field, where most tasks are one-off, the need for verbal communication is particularly marked. Spontaneity, immediacy and confidentiality are characteristic aspects of managerial communication. Improved verbal communications, such as the videophone or teleconferencing make the greatest contribution to improving performance here.

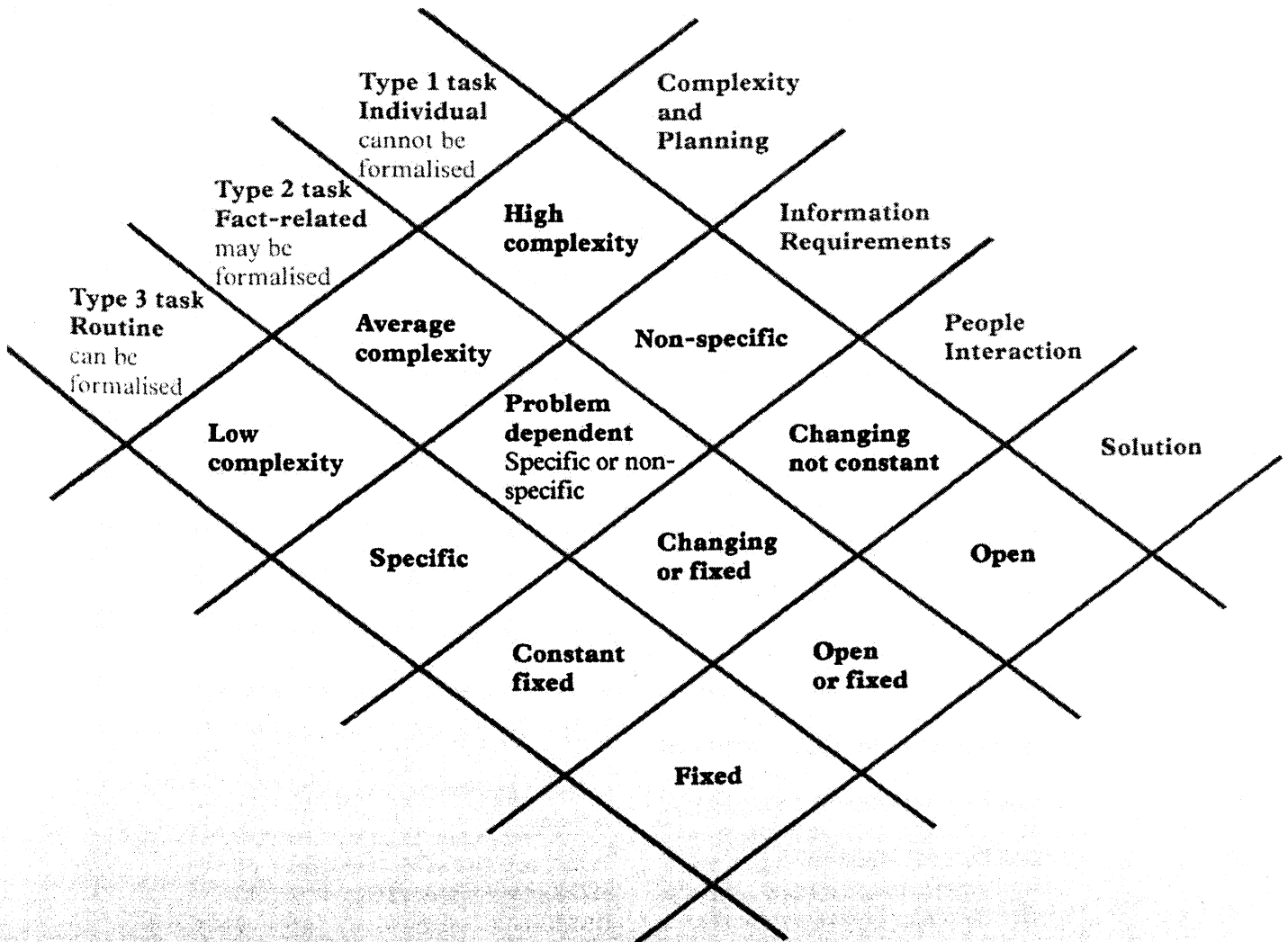
In Type 2 tasks, written communications tend to predominate because the communication processes have to maintain accuracy and the ability to serve both as records and as the basis for further data processing. As a result, text oriented communication media can have the greatest effect on productivity because until now producing written communication has been the major delaying factor in

getting work done. About half the working time in the administration field is generally reckoned to be taken up with completing written communication records. In industrial fact processing and in public administration each task leader produces on average ten standard pages of text daily.

It is in routine tasks (Type 3) that technological developments, particularly the introduction of electronic data processing, have brought about the greatest organizational change. Here individual communication is very much in the background in favour of programmed operating sequences.

Matching the task to the most appropriate new communications technology is therefore essential if the full potential benefits are to be gained. It would be wrong, for

### *Performance characteristics of office work*



example, to try to improve management with new text media, when the primary need is clearly for better dialogue systems. Jobs that are mainly fact processing will benefit from improved data and text communication, backed up with pictures and graphics, but not very much from, say, teleconferencing.

Using the three basic types of task we were able to examine the potential for organizational conflict arising from new technology.

Conflict can arise because traditional data processing and the new communications technologies have very different effects on how tasks are done. Data processing forces tasks towards standardization; communications technology tends to individualize them. Recognizing the potential conflict allows companies to avoid, say, imposing standardization data processing routines on unstructured Type 1 tasks or permitting too much flexibility in Type 3 tasks. In both cases the effect would be counter-productive. In particular, it has to be recognized that it is only the output of Type 3 tasks that can be measured easily. It may be possible to measure parts of Type 2 tasks, but not Type 1. For example, the level of labour expended by a management team in planning an investment project, particularly if a lot of decision makers, such as management, banks, employees and works councils, are involved, is difficult to measure. The results of such planning work can often only be judged in the long term.

The pressures to impose standardized routines on management tasks come partly from data processing staff, who frequently have the belief that all office work can be standardized. Partly they come too from the accounting function, which is naturally concerned to increase measurability to aid profit calculation and planning and control. But over-bureaucratizing the Type 1 and Type 2 tasks will normally damage productivity. Top management has to ensure that the correct balance is maintained between standardization and individuality. And that means a close understanding of what communica-

tion needs each task involves.

For Type 1 tasks the operating rules need to be loose and informal, with minimal standardization. The support services take up the slack of *ad hoc* tasks. Using the introduction of new technology to cut support services here may actually work against organizational efficiency by removing the ability to respond to urgent items.

The opposite is true in Type 3 tasks, which can be increasingly programmed so they are performed autonomously.

For Type 2 tasks, falling between these two extremes, the accent needs nevertheless to be on the reaction to individual cases rather than on the handling of routine matters. The more rigid the organization, the less effective it will be.

Although there is still a long way to go before integrated office systems become truly effective, it is clear they will have a considerable influence on how work is organized. Until recently the dominant strategy for technological innovation in the office focused on dividing up tasks. But the new communications technologies create an impetus to combine separate tasks and to recombine tasks which used to be performed in separate parts. For example, the separation of information compilation, despatch and filing acts as a barrier to new technology.

If it is to gain the maximum benefits from the new office technologies, top management needs to make sure that the right questions are being asked about its likely effects on the organization of tasks. Among those questions are:

**What are the effects on job separation in the office? (vertical or horizontal job integration)**

**What are the effects on the operating sequence? (effects that standardize a task versus effects that individualize a task)**

**What are the effects on the co-operation with support services? (role of secretarial and typing services)**

**What are the effects on the efficiency of the office organization?**

### **What are the effects on the labour requirement?**

### **What are the effects on the qualifications and professional training needed in the office?**

The issue of job separation or integration is closely involved with the nature of the task itself. We have identified two models of job organization based on new office technology – the 'self-sufficient' and the 'co-operative'.

Many equipment manufacturers now advocate the self-sufficiency model. This links technology in management and fact processing to make the task leader autonomous. Jobs are brought together vertically. The task leader, equipped with multi-functional equipment at the work station, becomes independent of support services. With only technological back-up, management and qualified staff produce texts, process graphics and visual images themselves, perform communication processes autonomously and can also perform the filing and retrieval of information.

In the co-operative approach, jobs are brought together horizontally, on the assumption that members of a co-operative team can perform their tasks faster and better using integrated technology and release capacity for additional tasks. Managers are given new projects, qualified staff can perform extra work. In the support services, field processes such as obtaining information, producing written documents, graphics or statistics and retrieval processes can be combined. The technological input improves the conditions for all forms of co-operation and mutual preliminary work. It also opens up the possibility of more effective delegation.

The co-operative model demands more highly skilled people and – particularly in the qualified staff and management areas – it requires more decision-making ability and autonomy of action. Under these circumstances the efficiency, flexibility and responsiveness of all members of the team increases.

These are, of course, idealized circumstances. Nevertheless, they

show the two different directions of organizational innovation in office work. Self-sufficiency can be seen as a cost-oriented, input-related approach to improving office productivity. The co-operative concept is an output-related approach.

The idea of self-sufficiency works by replacing manpower wherever possible with information technology. In this way the labour input (in secretarial, in staff services and in the employee field) is reduced. But operating this way only results in increased productivity if the support activities replaced by new technologies can be simplified and reduced so that they can be absorbed by the task leader. If the total output remains the same, productivity only increases if the total labour input drops. If taking away support services means the task leader has to work harder than before – even if surrounded by new technology – the productivity effect is negative, since cheaper labour has been replaced by dearer labour.

Unlike data processing, communications technology can operate with highly flexible operating sequences and information inputs. So the integrative nature of new communications technology holds out the possibility of job structures characterized by:

**Increased co-operation and inclusion of a greater number of participating groups in the decision-making processes**

**Increased productivity and improved flexibility in all spheres of work**

**Increased decision-making power and autonomy of action for the task leader (an essential pre-requisite for organizational decentralization!)**

On the basis of these outlines of the influence of new technology on work separation and on the organization of operating sequence, we can describe four strategies for new and more productive office work structures. With the self-sufficiency approach we join together structures that correspond to Type 3 tasks. In the co-operation model, the structures correspond to Type 1 tasks. Self-

sufficiency and co-operation are competing strategies in the area of medium level fact processing (Type 2 tasks).

The four organizational strategies are:

**Vertical combination of tasks with flexible job organization**

Appropriate to Type 2 office work, if most of the tasks involved generally cannot be given a formal structure and if there is little need for support services

**Horizontal combination of tasks with flexible job organization**

Suitable for Type 1 office work and Type 2, if the Type 2 tasks are generally difficult to formalize and if there is a need for a high level of support services

**Vertical combination of tasks with rigid job organization**

Applicable to Type 3 office work and Type 2, if the Type 2 tasks can in the main be formalized and if there is only a low need for support

**Horizontal combination of tasks with rigid job organization**

Suitable for areas (generally Type 2 work) where tasks can be formalized and there is a high need for support services.

What all this means for the large employer is that considerably more care and analysis must go into both the selection of information technology and the design of organization structure. Each has a major influence on the other and cannot operate in isolation. And both will influence and be influenced by the tasks they attempt to support and control.